

EFFECTS OF 3-METHYLHISTAMINE AND PHENYLETHYLAMINE ON HISTAMINE ACTION ON ISOLATED GUINEA-PIG TRACHEA RINGS

GAJOVIĆ OLGICA*, LAZIĆ ZORICA*, PANTOVIĆ SUZANA**, ČOLIĆ MAJA**, STOJANOVIĆ JELICA***, STANARČIĆ JELENA**, ROSIĆ G** and ROSIĆ M*

*University of Kragujevac, Medical Faculty, Clinical Center, Kragujevac, Serbia

**University of Kragujevac, Medical Faculty, Serbia

***University of Kragujevac, Faculty of Natural Science and Mathematics, Serbia

(Received 5th June 2011)

It is well known that histamine produces constriction via H_1 receptors and decreases tracheal smooth muscle tone via H_2 and H_3 receptors. In addition, it has already been reported that 3-methyl-histamine and phenylethylamine are competitive antagonists of histamine N-methyl-transferase (HMT), the enzyme responsible for rapid inactivation of histamine. Our results suggest the possibility that 3-methyl-histamine and phenylethylamine as competitive antagonists of histamine N-methyl-transferase lead to potentiation of histamine induced constriction of isolated guinea-pig trachea, probably due to the decrease of histamine methylation and consequent inactivation. In as much, 3-methyl-histamine and phenylethylamine had no effect on the basal tone of isolated trachea smooth muscle, as well as on other mechanisms leading to increased responsiveness of guinea-pig tracheal smooth muscle (acetylcholine, KCl, electro stimulation).

Key words: 3-methyl-histamine, airways, histamine N-methyl-transferase, phenylethylamine

INTRODUCTION

Histamine plays one of the mayor roles in the control of airway responsiveness. The action of histamine on tracheal smooth muscles is very complex. It can be shortly described as "a subtle balance of contraction and relaxation" (Jolly and Desmecth, 2003). Histamine produces constrictions of tracheal smooth muscles via H_1 receptors (Ash and Schild, 1966; Barnes *et al.* 1998), but at the same time histamine decreases tracheal smooth muscle tone via H_2 (Chand, 1980; Eyre, 1973) and H_3 receptors (Burgaud J-L and Oudart, 1993; Ichinose and Barnes, 1989).

Histamine N-methyl-transferase (HMT) is the enzyme responsible for rapid inactivation of histamine by methylation of ring tele-nitrogen in histamine (Fogel *et al.*, 2007; Fram and Green, 1968). HMT represents in the airways the primary enzyme witch degrades histamine and the epithelium of the airways is a rich

